Contribution ID: **77** Type: **Talk**

Statistical evaluation and optimization of entanglement purification protocols

Wednesday, 8 May 2024 11:00 (30 minutes)

Quantitative characterization of two-qubit entanglement purification protocols is introduced. Our approach is based on the concurrence and the hit-and-run algorithm applied to the convex set of all two-qubit states. We demonstrate that pioneering protocols are unable to improve the estimated initial average concurrence of almost uniformly sampled density matrices, however, as it is known, they still generate pairs of qubits in a state that is close to a Bell state. We also develop a more efficient protocol and investigate it numerically together with a recent proposal based on an entangling rank-two projector. Furthermore, we present a class of variational purification protocols with continuous parameters and optimize their output concurrence. These optimized algorithms turn out to surpass former proposals and our new protocol by means of not wasting too many entangled states.

Presenter: PRETI, Francesco (FZJ)

Session Classification: Talks